CLAIMS

What is claimed is:

1. A method comprising:

receiving a serialized stream of state change requests over a network for a network device, said network device having a current state object representing a current state of the network device;

modifying a desired state object with each of the state change requests in the serialized stream, said desired state object representing a desired state for the network device;

reading an instance of the desired state object at a particular instant in time;

comparing the instance of the desired state object to the current state object; and

determining a set of tasks to change the current state of the network device to the desired state based on the comparison.

2. The method of claim 1 wherein receiving the serialized stream of state change requests comprises:

storing the serialized stream to a queue as it is received;

determining when the desired state object is locked; and

providing the serialized stream from the queue only when the desired state object is not locked.

3. The method of claim 1 wherein modifying the desired state object comprises:

detecting that a sequential state change request has been received from the serialized stream;

locking the desired state object;

identifying a state field in the desired state object corresponding to the sequential state change request; and

updating the state field based on the sequential state change request.

4. The method of claim 1 further comprising:

performing the set of tasks;

updating the current state object;

reading a next instance of the desired state object after the set of tasks are complete;

comparing the next instance of the desired state object to the current state object; and

determining a next set of tasks to change the current state of the network device to the desired state based on the comparison.

5. The method of claim 1 wherein reading the instance of the desired state object comprises:

determining if the desired state object is locked; and

waiting to read the next instance of the desired state object if the desired state object is locked.

6. The method of claim 1 wherein the network device comprises a Universal Plug and Play (UPnP) device.

7. The method of claim 6 wherein the UPnP device comprises a device executing a media renderer application.

8. The method of claim 1 wherein the network device comprises at least one of a television, a radio receiver, a digital versatile disk (DVD) player, a compact disk (CD) player, a video cassette recorder (VCR), an audio tape player, a personal computer, a personal data assistant, and a MP3 (Moving Picture Experts Group (MPEG) – 1, Audio Layer 3) player.

9. The method of claim 1 wherein the network comprises at least one of the Internet, a wide area network, a local area network, and a system-level network within the network device.

10. The method of claim 1 wherein the serialized stream is received from a plurality of control points.

11. The method of claim 1 wherein the current state object comprises a first data structure having a first plurality of fields, each of the first plurality of fields corresponding to at least one of a plurality of state variables that collectively define the current state of the network device; and

wherein the desired state object comprises a second data structure having a second plurality of fields corresponding to the first plurality of fields.

12. The method of claim 11 wherein reading the instance of the desired state object comprises copying the second data structure; and

wherein comparing the instance of the desired state object to the current state object comprises comparing the first data structure and the copy of the second data structure.

13. The method of claim 1 wherein the current state object comprises actual states of a plurality of components comprising the network device; and

wherein the desired state object comprises a plurality of state fields that correspond to the plurality of components.

14. The method of claim 13 wherein reading the instance of the desired state object comprises copying the plurality of state fields; and

wherein comparing the instance of the desired state object to the current state object comprises determining any differences between contents of the copy of the plurality of state fields and the actual states of the plurality of components.

15. The method of claim 1 further comprising:

determining that the desired state object has stabilized before determining the set of tasks to change the current state.

16. The method of claim 15 wherein determining that the desired state object has stabilized comprises:

repeating the reading and comparing until the DSO has not changed for a particular number of iterations.

17. The method of claim 1 wherein the set of tasks comprises multiple state changes.

18. The method of claim 1 wherein receiving the serialized stream and modifying the desired state object comprise a first thread, and wherein reading the instance of the desired state object, comparing the instance of the desired state object to the current state object, and determining the set of tasks comprise a second thread, the method further comprising:

executing the first thread and the second thread simultaneously.

19. The method of claim 4 wherein performing the set of tasks comprises:

executing one of a plurality of worker threads for each of the set of tasks, each of said plurality of worker threads corresponding to one of a plurality of states comprising the current state.

20. The method of claim 1 wherein each of the state change requests in the serialized stream comprises one of a plurality of actions and/or one of a plurality of state variables corresponding to the network device.

21. The method of claim 20 wherein the plurality of actions comprise at least one of play, stop, pause, next, previous, increase/decrease volume, increase/decrease brightness, increase/decrease contrast, toggle mute, access playlist URI (universal resource identifier), increase/decrease red/black/green/blue levels, and increase/decrease play speed.

22. The method of claim 20 wherein the plurality of state variables comprise at least one of last action, track number, volume, brightness, contrast, mute, current playlist, red/black/green/blue levels, and play speed.

23. The method of claim 20 wherein the desired state object comprises a plurality of fields, each of said plurality of fields corresponding to one or more of the plurality of actions and the plurality of state variables.

24. The method of claim 23 wherein the plurality of fields comprise a last action field and a target track field, and wherein modifying the desired state object comprises:

overwriting the last action field with an action state variable from a given state change request if the given state change request includes the action state variable; and

incrementing or decrementing the target track field if the action state variable from the given state change request indicates a track change.

25. A machine readable medium having stored thereon machine executable instructions that, when executed, implement a method comprising:

receiving a serialized stream of state change requests over a network for a network device, said network device having a current state object representing a current state of the network device;

modifying a desired state object with each of the state change requests in the serialized stream, said desired state object representing a desired state for the network device;

reading an instance of the desired state object at a particular instant in time;

comparing the instance of the desired state object to the current state object; and

determining a set of tasks to change the current state of the network device to the desired state based on the comparison.

26. The machine readable medium of claim 25 wherein receiving the serialized stream of state change requests comprises:

storing the serialized stream to a queue as it is received;

determining when the desired state object is locked; and

providing the serialized stream from the queue only when the desired state object is not locked.

27. The machine readable medium of claim 25 wherein modifying the desired state object comprises:

detecting that a sequential state change request has been received from the serialized stream;

locking the desired state object;

identifying a state field in the desired state object corresponding to the sequential state change request; and

updating the state field based on the sequential state change request.

28. The machine readable medium of claim 25, the method further comprising:

performing the set of tasks;

updating the current state object;

reading a next instance of the desired state object after the set of tasks are complete;

comparing the next instance of the desired state object to the current state object; and

determining a next set of tasks to change the current state of the network device to the desired state based on the comparison.

29. The machine readable medium of claim 25 wherein reading the instance of the desired state object comprises:

determining if the desired state object is locked; and

waiting to read the next instance of the desired state object if the desired state object is locked.

30. The machine readable medium of claim 25, the method further comprising:

determining that the desired state object has stabilized before determining the set of tasks to change the current state.

31. A system comprising:

an audio component having a network port; and

a media renderer application to be executed by the audio component to implement a method comprising

receiving a serialized stream of state change requests over a network for a network device, said network device having a current state object representing a current state of the network device;

modifying a desired state object with each of the state change requests in the serialized stream, said desired state object representing a desired state for the network device;

reading an instance of the desired state object at a particular instant in time;

comparing the instance of the desired state object to the current state object; and

determining a set of tasks to change the current state of the network device to the desired state based on the comparison.

32. The system of claim 31, the method further comprising:

performing the set of tasks;

updating the current state object;

reading a next instance of the desired state object after the set of tasks are complete;

comparing the next instance of the desired state object to the current state object; and

determining a next set of tasks to change the current state of the network device to the desired state based on the comparison.

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33. The system of claim 31 wherein the media renderer application comprises at least one of firmware and software.